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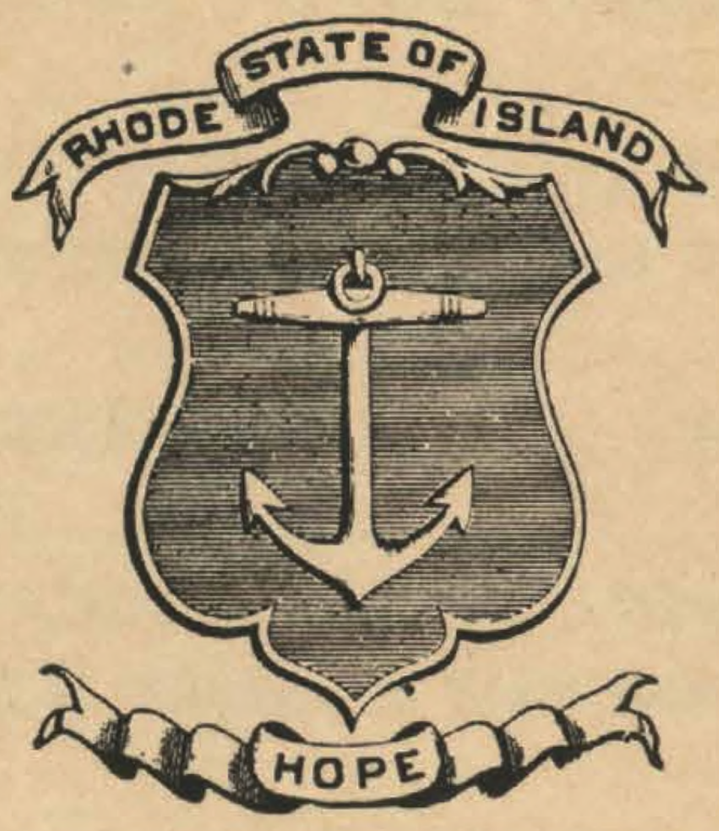
VOL. VII, No. 5 FOR FEBRUARY, 1922

REPORT OF THE BOARD OF MANAGERS



KINGSTON, R. I.

1922

PUBLISHED QUARTERLY BY THE COLLEGE
MAY, AUGUST, NOVEMBER, FEBRUARY

ENTERED AT KINGSTON, RHODE ISLAND, AS SECOND-CLASS MATTER

RHODE ISLAND STATE COLLEGE

Corporation.

HON. WALTER E. RANGER, *President,* Commissioner of Education, *ex-officio* .....Providence
HON. ZENAS W. BLISS, *Vice-President*.....Providence Co., Providence
HON. ROBERT S. BURLINGAME, *Clerk and Treasurer*.....
.....Newport Co., Newport
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HON. CHARLES ESTES.....Bristol Co., Warren
HON. ROWLAND HAZARD.....Washington Co., Peace Dale
HON. PHILIP A. MONEY, Member of State Board of Agriculture, Exeter

Board of Visitors for 1921-22.

MR. FRANK L. PIERCE,* *Chairman*.....Providence
MRS. RICHARD JACKSON BARKER.....Tiverton
MISS CAROLINE HAZARD.....Peace Dale
DR. JOSEPH B. MUNROE.....Warren
MRS. WALTER RODMAN.....Davisville
MR. ISAAC L. SHERMAN.....Newport
MRS. DAVID J. WHITE.....Davisville

*Deceased.

REPORT

To His Excellency Emery J. San Souci, Governor, and the Honorable General Assembly of the State of Rhode Island and Providence Plantations, at its January Session, 1922:

I have the honor to submit herewith the Thirty-fourth Annual Report of the Board of Managers of Rhode Island State College, as required by law.

WALTER E. RANGER,

President, Board of Managers.

REPORT OF THE PRESIDENT OF THE COLLEGE

To the Board of Managers, Rhode Island State College;

GENTLEMEN: I have the honor to submit, as my report for the year 1921, the following:

Agricultural and Administration Building.

The year has been signalized by the completion and occupancy of the new Agricultural and Administration Building. Completed shortly before the first of September, we were able to avail ourselves of its commodious offices, classrooms, and laboratory rooms at the beginning of the most successful year the college has ever had. It was not available a moment too soon. With an increase in attendance of thirteen per cent. and with accommodations previously filled to overflowing, every part of the commodious new building was promptly utilized; and now the wonder is how we ever managed to go through the previous year without it.

It is a handsome and dignified building of stone, 120 by 54 feet in foundation dimensions. It has a well-lighted basement fitted for work in farm machinery, dairying and refrigerating rooms, storage, and fire-proof vault. On the main floor are placed the administration offices, the office of the dean of agriculture and his assistant in agronomy, the post-office, and three large and well-lighted class-rooms. The second floor accommodates the agricultural extension service and the laboratories for animal husbandry, advanced dairying, milk-testing, and horticulture, affording in addition two other much-needed classrooms. The third floor will eventually be utilized for farm management, soils laboratory, landscape design and agricultural chemistry. At present and until we have money for laboratory furniture and equipment for the work just mentioned, a part of the third floor space is used by the agricultural department for such work as can be done without proper equipment, and a part by the military department and by a student organization. Space for both

these purposes is sorely needed, and it is a problem to know where to find such space when the agricultural department takes entire possession. Mention is made of this last fact only to show that from the very beginning the building has been fully utilized. The attic is spacious, well-lighted, and accessible both by stairway and by lift, the latter running from the basement. It is used for storage for the various departments. By means of the lift, heavy articles can be unloaded in the basement and carried to any floor, including the attic.

History of Building.

The history of this building extends over a number of years, and it is something of an achievement both for the State and the college to have brought it to successful completion.

In 1917 a request was made that the General Assembly appropriate $80,000 for the building and $20,000 to furnish it. The General Assembly graciously passed a resolution, approved April 16, 1917, which included the amount of $80,000 for such a building. On April 6, 1917, the United States declared war against Germany. After careful consideration of conditions as they developed during the year, your Board determined that it would be unpatriotic to proceed with building operations and so stated to the General Assembly in your Report for the year 1917.

During much of the year 1918 the college was in effect a military camp; and the building project remained in abeyance. Meanwhile building costs had risen materially, and in 1919 request was made for an additional fund of $25,000 for the building contemplated. This was granted in a resolution approved April 24, 1919, which provided that the total amount so far appropriated, viz., $105,000, should become available on and after January 1, 1920.

By this time, prices had practically doubled, and it had become evident that the building could not be constructed for the amount authorized. At the same time, the need for the larger accommodations planned for had become increasingly urgent. Accordingly, another additional appropriation was sought of the Assembly of 1920, amounting to $45,000, and bringing the total up to $150,000. This further aid was granted in a resolution approved April 20, 1920.

Contractual estimates for construction were sought during the

early part of 1920, but they were all greatly in excess of our funds, even when the omission of essential features of the building was considered. It was, therefore, determined that the college should employ a superintendent and proceed to build. Ground was broken in March, and the building proceeded rather slowly and under many difficulties, both in procuring material and in securing and holding labor. Among other things, it developed that our quarry on the grounds was running out, and that longer stone for lintels and the like could not be gotten out from it unbroken by seams. We were fortunate in being able to procure from Mr. Duncan Rusk, with whom the college had a contract for quarrying stone from our quarry, the necessary longer stone at the additional cost of freight, merely, from his quarry at West Townsend, Massachusetts.

In January, 1921, it again became evident that the building could not be completed in all its parts according to the original plan without a further appropriation. Accordingly your Board went to the General Assembly of 1921 with a final request for $25,000 additional. This was granted in a resolution approved April 21, 1921, and the total amount used in constructing the building thus became $175,000.

It is right that, as part of this record, I should express for the college and for myself as its executive head our high appreciation of the patience and generosity of the General Assembly under unusually trying conditions, and our sincere gratitude for the steady support given.

I desire also to acknowledge our obligations (a) to the architect, Mr. E. B. Homer, for wise and helpful counsel in addition to and apart from the excellence of his plans and the conscientiousness of his supervision; (b) to our stone contractor, Mr. Duncan Rusk of West Townsend, Mass., for honest and faithful work and for kindly helpfulness and forbearance in all our intercourse; (c) to Superintendent Arthur Beaudoin of Providence, one of the most faithful, industrious, and efficient builders I have ever known, who pushed the building steadily along until his very sudden death almost while on actual duty, and (d) to Superintendent Arthur Grenier, also of Providence, who took up the work as it dropped from Mr. Beaudoin's hand, and carried it forward to successful and satisfactory completion.

Itemized Cost of Building.

The cost of the building analyzed under various headings is as follows:

Excavation	$1,247 90
Water mains, etc	1,257 72
Contract for quarrying	40,652 45
Supplementary wages to quarry workers, as per contract, plus freight	3,065 00
Contract for mason work	13,306 00
Labor and materials	93,523 05
Heating and plumbing	4,148 29
Electric wiring, etc	1,351 70
Architect	8,267 21
Superintendent	5,448 50
Furnishings	1,821 64
Fire protection	211 19
Miscellaneous	699 35
	$175,000 00

Certification of Faculty Members.

On the initiative of our college faculty, negotiations were begun and carried to completion through your Board to the end that the professors and teachers employed by the college should be recognized and accredited by the State Board of Education as an integral part of the great body of instructional officers in the service of the State of Rhode Island. Grades of college certification have been created by the State Board of Education and corresponding requisites for certification have been drawn up. Under these requirements all teaching employees at the college are now certificated by the Board of Education, and all future employees must conform to the requirements fixed in their respective grades and must be duly certificated before beginning to teach in the college.

By act of the General Assembly, the length of service in teaching of all teachers at present certificated at the college is recognized by law, and they have become eligible for State pensions under the terms of the State pension law on an equal footing with other teachers in the State system.

So far as is known, this arrangement is distinctly a pioneer movement, formally recognizing the college teachers as coming under the same State oversight and enjoying the same privileges as do the other members of the public school system.

Attendance.

The usual tables of attendance are herewith presented. They show an attendance of four hundred and one as against three hundred and fifty-six one year ago, an increase of thirteen per cent. The increase is both among the young men and the young women. The senior class has an increase of seventy-four per cent. and that of new matriculates is sixteen per cent. There is an increase in the agricultural course of eighteen per cent., in the engineering course of seven per cent., in the applied science course of thirty-seven per cent., and in the home economics course of six per cent.

The increase from without the State is five and a half per cent., while that from within the State is thirteen per cent. The total attendance from within the State is eighty-six per cent. of the whole number of students. The number of towns represented is, without the State, thirty-two, and within the State, twenty-eight, as against thirty-one and twenty-eight of last year. The number of students from Providence is one hundred and thirty-two, as against one hundred and sixteen last year. Twenty of the high schools of the State are represented, as against eighteen last year, and twenty-two high schools outside the State, against eighteen last year. The tables follow:

TABLES SHOWING ANALYSIS OF ATTENDANCE.

TABLE No. 1.

Showing Attendance by Classes During the Years From 1918-1922.

Registration in Courses.

CLASSES.	1917–18	1918–19	1919–20	1920–21	1921–22
Graduate Students.....	2	2	4	4	4
Seniors	25	32	41	34	59
Juniors	46	43	53	69	75
Sophomores	65	48	88	98	93
Freshmen	98	125	143	134	138
Irregular	7	5	3	11	15
Total, college courses.....	243	255	332	350	384
Two-Year courses.....	8	.....	10	6	17
Student Army Training Corps...	.....	268	.....	.....	.....
Total.....	251	523	342	356	401
Names repeated.....	.....	121	.....	.....	.....
Total.....	.....	402	.....	.....	.....
Two Mechanics Units.....	.....	515	.....	.....	.....
Total.....	251	917	342	356	401

TABLE No. 2.

Showing Number of Men and Women, of New and Previous Matriculates, and Number in the Several Courses by Classes for

Collegiate Year 1921-22.

Class.	Sex. Men.	Sex. Women.	Date of Matriculation. Previous to 1921.	Date of Matriculation. 1921.
Graduates	3	1	.....	4
Seniors	43	16	59	.....
Juniors	61	14	75	.....
Sophomores	77	16	92	1
Freshmen	115	23	8	130
Irregular	10	5	2	13
Total College	309	75	236	148
Two-year	17	.....	2	15
Grand Total	326	75	238	163

	Agric.	Engineering. Chem	Civil	Elec.	Mech.	Total	Appl. Sci.	Home Ec.	Educ.	Total
Graduates	....	....	....	....	....	....	4	....	....	4
Seniors	7	5	5	9	6	25	12	14	1	59
Juniors	9	5	5	20	14	44	9	13	....	75
Sophomores	12	8	9	21	16	54	13	14	....	93
Freshmen	16	....	....	....	....	70	31	21	....	138
Irregular	5	1	....	....	....	1	5	3	1	15
Total	49	19	19	50	36	194	74	65	2	384
Two-year	17	....	....	....	....	....	....	....	....	17
Grand Total	66	19	19	50	36	194	74	65	2	401

HOME RESIDENCE OF STUDENTS.

A. Resident outside of the State:

Connecticut:		Groveland	1
Hartford	1	Haverhill	1
Middletown	1	Littleton	1
Mystic	1	Lynnfield Center	1
New London	2	Needham	1
Stonington	1	North Attleboro	2
	6	North Easton	1
Massachusetts:		Orange	1
Avon	1	Revere	3
Belmont	1	Seekonk	1
Boston	1	Swampscott	1
Bridgewater	1	Three Rivers	1
Brockton	13	West Somerville	1
Brookline	1	Whitman	2
Chatham	1		48
Dedham	1	New York:	
Dorchester	2	New York City	1
Everett	3	Pennsylvania:	
Fall River	5	Palmerton	2

Total attendance from without the State 57

B. Resident in Rhode Island by Counties and Towns:

Bristol County:		Providence	132
Barrington	2	Scituate	1
Bristol	6	Smithfield	1
Warren	4	Woonsocket	21
	12		234
Kent County:		Newport County:	
Coventry	4	Jamestown	2
East Greenwich	7	Little Compton	4
Warwick	6	Newport	18
West Warwick	10	New Shoreham	1
	27		25

Providence County:	
Burrillville	7
Central Falls	1
Cranston	25
Cumberland	7
East Providence	16
Glocester	2
Lincoln	5
Pawtucket	16
Washington County:	
Hopkinton	3
Narragansett	1
North Kingstown	2
South Kingstown	29
Westerly	11
	46
Total attendance from within the State	344

Entrance Statistics for Class Registering in 1921.

Total enrollment of class		138
Number received from high schools	130	
Number re-classified and repeating work	8	
Number credited with fourteen units or more	111	
Number credited with thirteen and a half units	11	
Number credited with thirteen units	8	
		130
Total entering without condition		70
Entering with condition of one-half unit, required work	27	
Entering with condition of one unit, required work	18	
Entering with condition of one and one-half units, required work	8	
Entering with condition of two units, required work	5	
Entering with condition of two and one-half units, required work	2	
Total with conditions		60

Average age of men and women, Oct. 1, 1921....18 years, 9 months, 28 days
Age of youngest member of class, Oct. 1, 1921...15 years, 10 months, 0 days
Age of oldest member of class, Oct. 1, 1921.....24 years, 11 months, 28 days

Schools Represented in Registration of Freshman Class.

In Rhode Island:

Barrington High	1
Burrillville High	2
Cranston High	13
Cumberland High	3
East Greenwich Academy	1
East Providence High	2
Newport-Rogers High	4

In Massachusetts:

Attleboro High	1
Boston English High	1
Brockton High	4
Brookline High	1
Dedham High	1
Dorchester High	1

Pawtucket High	8
Providence:	
Classical	8
English High	2
Hope Street High	3
Technical High	27
LaSalle Academy	2
St. Xavier Academy	1
South Kingstown High	10
Warwick High	2
Westerly High	2
West Warwick High	3
Woonsocket High	5
	99

In Connecticut:

Killingly High	1
Bulkeley High	1
Stonington High	1
	3

Everett High	2
Fall River:	
B. M. C. Durfee	5
Dominican Academy	1
Haverhill High	1
Needham High	1
Revere High	2
Somerville High	2
Taunton High	1
Wakefield High	1
Whitman High	1
	26

In New Jersey:

Passaic High	1

In New York:

DeWitt Clinton High	1
	130

Finances.

The financial statement as to maintenance for the year shows a credit balance of $51.43. The total receipts for the year, including a maintenance fund of $100,000 from the State, were $188,182.15 and the total expenditures were $188,130.72.

The tables accompanying give detailed analysis of expenditures and sources and amounts of income. For comparison, I am giving in parallel columns (a) the expenditures and receipts of 1920, (b) the estimates submitted at the beginning of 1921, and (c) the estimates submitted at the beginning of the current year 1922.

TABLE I. CLASSIFIED EXPENDITURES.

	Purpose.	Expended 1920.	Estimate Submitted for 1921.	Actually Expended 1921.	Estimate Submitted for 1922.
1	Advertising	$130 75	$900 00	$195 90	$200 00
2	Apparatus	3,671 80	4,000 00	2,613 99	2,300 00
3	Auto and stable supplies	975 82	1,000 00	1,601 90	1,000 00
4	Books and periodicals	786 74	1,000 00	1,125 80	1,000 00
5	Commencement	1,458 29	1,000 00	1,218 53	1,000 00
6	Construction and repairs	8,829 50	9,000 00	9,226 97	8,000 00
7	Electric current	702 34	700 00	1,576 82	1,600 00
8	Entertainment	609 53	500 00	560 25	500 00
9	Feed	7,449 33	4,000 00	4,109 01	4,000 00
10	Fertilizers	934 35	600 00	643 91	600 00
11	Freight and express	642 73	800 00	718 49	700 00
12	Fuel	25,195 14	20,000 00	17,212 34	17,250 00
13	Furniture and fixtures	1,831 46	2,000 00	825 11	500 00
14	Gasoline and oil	2,150 64	2,150 00	2,427 34	2,400 00
15	Janitors' supplies	511 24	400 00	358 56	350 00
16	Labor	26,935 53	22,500 00	27,812 41	27,000 00
17	Laboratory supplies	2,382 35	3,000 00	3,307 84	3,000 00
18	Lecturers	.....	.....	.....	700 00
19	Live stock	200 30	500 00	30 00	.....
20	Postage, printing and stationery.	3,695 56	3,500 00	3,512 23	3,500 00
21	Refunds	389 26	400 00	1,019 81	1,000 00
22	Rentals	3,101 80	3,100 00	3,651 04	3,650 00
23	Salaries	87,622 72	93,250 00	97,457 88	108,000 00
24	Seeds	730 95	500 00	334 19	400 00
25	Telephone and telegraph	862 83	900 00	830 81	850 00
26	Tools and machinery	1,069 31	1,000 00	397 47	400 00
27	Traveling	1,809 90	1,800 00	2,553 44	2,500 00
28	Miscellaneous	2,684 97	3,000 00	2,808 68	3,000 00
	Totals	$187,365 14	$181,500 00	$188,130 72	$195,400 00

TABLE II. CLASSIFIED RECEIPTS.

	Source.	Receipts 1920	Estimated Receipts for 1921.	Actual Receipts for 1921.	Estimated Receipts for 1922.
1	Morrill fund of 1890				
	(a) Bal. on hand Jan. 1....	22,401 95	16,753 09	16,753 09	25,040 73
	(b) Received July 1 50,000 of which amount used to Dec. 31	33,246 91	25,000 00	24,959 27	25,000 00
2	Morrill fund of 1862.....	2,500 00	2,500 00	2,500 00	2,500 00
3	State maintenance grant.....	75,000 00	100,000 00	100,000 00	100,000 00
4	Balance from current fund.....	.....	.....	.....	51 43
5	Current receipts	38,922 22	37,500 00	43,969 79	43,000 00
	Totals.....	$172,071 08	$181,753 09	$188,182 15	$195,592 16
	Deficit reported and paid by State	$15,294 06	.....	.....	.....
	Final totals	$187,365 14	$181,753 09	$188,182 15	$195,592 16

In the expenditures estimated for 1922, items 2, 3, 6, 13, 17, 19, and 26 have been placed at lower figures than the expenditures of the previous two years would warrant, because items in the special requests for repairs and replacements explained further on will, if granted, reduce maintenance expenditures under these heads. It always costs more to work with outworn and inefficient equipment than to operate with new and adequate tools and appliances.

Item 7, electric current from the Narragansett Pier Company, has been considerably increased because while it is economical for us to generate electricity during the time when heat is being supplied to the buildings, it is a saving in coal bills to buy current from outside during the other months of the year. Item 12, fuel, has been reduced partly because of reduced prices on coal and partly because of saving in the use of coal, as indicated under item 7.

In accordance with understandings reached a year ago, salary rates were increased during the year, but because of lack of funds, they could not be put into operation until the last third of the year. The increased estimate in item 23 is not made to permit of further increases either in number or rate of salaries, but only in order to

carry out for the whole year 1922 the increased rates put into effect in the last third of 1921.

On the basis of these figures, your Board authorized that we request a maintenance fund for 1922 of $100,000.

Special Appropriations Requested.

By your vote, requests for special appropriations aggregating $58,500 for the year 1922 have been placed before the General Assembly. The items are:

A.	For furnishing and equipping the new Agricultural Building	$13,750
B.	For major repairs, replacements and additions necessary	13,650
C.	For renewals, replacements and additions to scientific apparatus	15,400
D.	For purchasing live stock	1,500
E.	For repairs and additions to trucks	2,200
F.	For aid to experiment station	7,000
G.	For fire protection	5,000
		$58,500

A. So far as has been possible, use has been made of such furniture and equipment for fitting out the agricultural building as could be collected from the various places where work had previously been carried on. It must be evident, however, that larger quarters demand larger equipment. The items required amount to $13,750.

B. The funds required for major repairs on the various college buildings other than the new building, together with replacements and additions necessary, foot up to $13,650. The reason for this relatively large amount in a single year is that all major repairs have been deferred since 1916 because of conditions that made it inexpedient to ask for further funds, even though necessary.

C. The same conditions have prevented previous requests for money with which to renew and add to scientific apparatus. Meanwhile much of our apparatus has become out-of-date, or has passed beyond the repair stage, while additions in quantity rendered desirable by increased numbers have not been possible. Our laboratories have decreased in efficiency. Laboratory efficiency is a means of lessening demands for increase in number of teachers and assistants. The amount asked for under this head is $15,400.

D. We have had very little money to use in building up our live stock. Breeding is a slow and somewhat uncertain process and depends upon the infusion of new blood from time to time. We ask for this purpose $1500.

E. Our trucks need thorough overhauling. A small closed car (Ford) is needed to convey guests and other persons to and from the station on college business. The college does a large part of its own repairing. A truck-shed with pit and heating arrangements is needed. Amount asked for for these purposes is $2,200.

F. The experiment station during practically its whole existence of thirty-odd years has been maintained without assistance from the State other than the use of buildings and land. It has done a great work for the agriculture of the State—a work which is most highly appreciated by our farmers. It has maintained the prestige of the college and the State among the forty-eight state experiment stations of our country, its bulletins being recognized everywhere as speaking with demonstrated authority on the subjects with which they have to deal. Its contributions on soil conditions are known and accepted everywhere.

Recently, at the urgent request of some of our best farmers, it has undertaken investigations in two entirely new fields of plant growth, in order to be able to give new and scientific direction to actual farm practice, under new conditions arising from decrease of sources of manure.

During these years its income has remained stationary. It is one of the very few experiment stations in the Nation whose Federal funds have not been materially supplemented by direct support from the State. When the high prices of materials and labor came, all that could be done was to lessen the area and subjects under investigation. This process, carried further than it now has been carried, would jeopardize the final success of investigations that have been in progress for many years, and on which many thousands of dollars have already been spent.

In common with all other salaried men the experiment station workers have felt the bitterness of salaries inadequate under the enormous rise of the plane of prices. The necessity for salary increases had to be met, and was met by aid from the maintenance

funds of the college in the same degree and to the same extent as was possible for the teaching force, and these subventions to experiment station workers are carried in the salary budget included in the college maintenance estimate.

The item under consideration has no reference to salary increases. It is asked for to meet two requirements: (a) in order to enable the experiment station to balance its present budget, and (b) to put forward some investigations in farm management and marketing processes. These investigations are regarded by the farmers as of extreme importance both to producers and to consumers of farm products, and farmers are earnestly insisting that they be undertaken.

Amount requested for the purpose of aiding the experiment station, $7,000.

G. Funds for fire protection asked for, $5,000. In 1920, at the request of the Board of Managers, the engineering department of the What Cheer Mutual Fire Insurance Company of Providence made a survey of our buildings and property free of charge; and in November of that year they presented a detailed report to your Board, which was printed as an appendix to your Board's Report of 1921. For full explanation of what the request under consideration means, reference is made to the 1921 Report, pp. 72-80.

These engineers estimated the replacement cost of the property on the college grounds to be $1,000,000. They made certain recommendations, some of which it seemed necessary at once to carry out, even at the cost of foregoing other necessities, and certain things were then done at a cost of some $1,500. They recommended a program of fire protection installation calling for $6,000 per year for five years.

Changes in the Personnel of the College Staff.

The changes in personnel have not been numerous during the year. Your Board granted to Dean R. L. Wales an eight months' leave of absence without pay to take up investigational work in Washington, D. C. The leave terminated September 1 last, and we were glad to welcome Professor Wales back again at that time. During his absence, Professor Webster served very acceptably as Dean; the

work of the engineering school was temporarily readjusted, and Mr. Frank A. Burr, B. S., of Providence, served as ad-interim instructor in mechanical engineering.

The resignation of Miss Elizabeth Bache was accepted to take effect September 1 last, and in her place as head of the home economics department Miss Alice L. Edwards, M. S., was appointed from the University of Illinois. Miss Edwards comes to us with training in three educational institutions, including Columbia University, and with teaching experience in the Oregon Agricultural College, the University of Minnesota, and the University of Illinois. She has already demonstrated her eminent fitness for the position which she is successfully filling.

Mr. W. S. McGuire, B. S., was appointed instructor in chemistry, and Miss Mary E. Williams instructor and assistant in bacteriology, vice Miss Helena M. Tibbetts, resigned.

Mrs. Winifred M. Keaney was appointed physical instructor for women.

In the experiment station, Robert L. Jones has been appointed assistant chemist to take the place of William Mather, resigned. Mr. F. P. Gross, assistant chemist, resigned in September.

Board of Visitors.

Very unfortunately, the Board of Visitors for the year 1921 was practically incapacitated for business by the long-continued illness and ultimate death of its chairman, Mr. Frank L. Pierce; and, still further, by the absence from the State of one of its most active members, Miss Caroline Hazard. Efforts were made from time to time to secure a meeting, but each time conditions arose which rendered the attempts abortive. There was every desire on the part of the members to discharge the duties entrusted to them, but Fate seemed against their meeting together. Consequently, there is from them this year no report.

I take this opportunity briefly to express my personal sense of loss in the death of Chairman Pierce. He was one of Nature's noblemen. Sound in judgment, kindly and sympathetic in disposition, courageous in action, optimistic in thought, he was ever ready to lend his strength to the forwarding of all worthy enterprises. He

was a sagacious and helpful friend to this college. His interest in it was constant and sincere. In his death the college loses a valued supporter, and I a friend whom I shall increasingly miss.

Commencement.

At the Commencement exercises the baccalaureate address was given by the writer; subject, "Render Unto Cæsar the Things That Are Cæsar's." The Commencement address was by Hon. James M. Beck, who gave a most brilliant address on "The Age of Machinery." The graduating class numbered thirty-seven, of whom one received the degree of Bachelor of Education and thirty-six the degree of Bachelor of Science. The degree of Master of Science in course was bestowed on two candidates; and that of Mechanical Engineer on Carle M. Bigelow. Honorary degrees were bestowed as follows:

On John L. Alger, President of Rhode Island College of Education, the degree of Doctor of Education.

On Clara L. Craig, professor in the same institution, the degree of Master of Education.

On William H. Sweetland, Chief Justice of the Supreme Court of Rhode Island, the degree of Doctor of Laws.

On Kenyon L. Butterfield, President of Massachusetts Agricultural College, the same degree.

All of which is respectfully submitted.

HOWARD EDWARDS,

President.

REPORT OF THE TREASURER

R. S. BURLINGAME, TREASURER, *in account with the different funds of* RHODE ISLAND STATE COLLEGE, *for the year ending December* 31, 1921.

MORRILL FUND OF 1890 AND NELSON ACT OF 1907.

1921.					
Jan.	1	To	Balance on hand		$16,753 09
July	1		U. S. warrant for year ending June 30, 1922		50,000 00
Dec.	31	By	Instruction	$41,712 36	
			Balance on hand	25,040 73	
				$66,753 09	$66,753 09

MORRILL FUND OF 1862.

1921					
Jan.	1	To	Cash from Landscrip Fund		$2,500 00
Dec.	31	By	Instruction	$2,500 00	
				$2,500 00	2,500 00

SMITH-LEVER FUND OF 1914.

1921					
Jan.	1	To	Balance on hand		$5,364 72
Sept.	10		U. S. Warrant (first instalment on $11,510 00 for year beginning July 1, 1921)		5,755 00
			Amount overdrawn		385 47
Dec.	31	By	Apparatus	$5 31	
			Furniture and fixtures	27 50	
			Labor	2 35	
			Library	66 13	
			Postage, telephone and express	21 75	
			Publications	788 50	
			Salaries	8,877 09	
			Stationery and printing	141 26	
			Supplies	29 75	
			Traveling	1,545 55	
				$11,505 19	$11,505 19

STATE—MAINTENANCE FUND.

1921					
Jan. 1	To	State appropriation			$40,000 00
April 1		Additional appropriation			60,000 00
Dec. 31	By	Apparatus	$2,225 57		
		Auto and stable supplies	1,405 15		
		Books	550 63		
		Chemicals	118 73		
		Commencement	875 03		
		Construction and repairs	6,054 84		
		Feed	3,360 17		
		Furniture	725 80		
		Fuel	13,022 53		
		Janitors' supplies	308 67		
		Labor (janitor, farm, etc)	17,330 56		
		Laboratory supplies	2,410 48		
		Live stock	30 00		
		Oil and gasoline	2,072 11		
		Postage, stationery and printing	2,104 42		
		Rental of land	350 00		
		Salaries	44,474 54		
		Seeds	309 90		
		Tools and machinery	342 96		
		Traveling	978 81		
		Miscellaneous	949 10		
				$100,000 00	$100,000 00

STATE—BUILDING FUND.

1921					
Jan. 1	To	Balance on hand			$28,104 24
April 1		Additional appropriation			25,000 00
Dec. 31	By	Architect	$1,247 00		
		Construction	41,328 42		
		Electric lighting	1,351 70		
		Fire protection	211 19		
		Furnishings	1,821 64		
		Grading	66 80		
		Heating and plumbing	4,148 29		
		Moving	146 95		
		Quarry	174 45		
		Superintendent	2,400 00		
		Water	207 80		
				$53,104 24	$53,104 24

Current Fund.

1921					
Jan.	1	To	Appropriation to cover deficit in 1920		$15,294 06
			Appropriation to replace Greenhouse Building		7,024 00
			Reserve Fund		2,000 00
			Department service		4,674 29
			Department sales		14,740 32
			Department fees		3,759 65
			Dormitory fees		7,762 12
			Laboratory sales		3,574 62
			Tuition		2,490 00
			Interest		421 90
			College of Education		370 83
			Vocational Board		4,534 19
			Miscellaneous		1,641 87
Dec.	31	By	Balance overdrawn	$21,504 08	
			Advertising in publications	195 90	
			Apparatus	388 42	
			Auto and stable supplies	196 75	
			Books	575 17	
			Commencement	432 10	
			Construction and repairs	3,873 75	
			Electric current furnished	1,576 82	
			Entertainment	560 25	
			Feed	748 84	
			Fertilizers	643 91	
			Freight and express	718 49	
			Fuel	4,189 81	
			Furniture	99 31	
			Horse labor	16 14	
			Janitor supplies	49 89	
			Labor (janitor, farm, etc.)	10,505 61	
			Laboratory supplies	865 16	
			Oil and gasoline	278 00	
			Postage and stationery	1,406 01	
			Refunds	1,019 81	
			Rental of dormitories	3,301 04	
			Salaries	8,770 98	
			Seeds	24 29	
			Telephone and telegraph	828 71	
			Tools and machinery	54 51	
			Traveling	1,576 73	
			Water rate	150 00	
			Miscellaneous	1,685 94	
			Reserve fund	2,000 00	
			Balance on hand	51 43	
				$68,287 85	$68,287 85

Trust Fund.

1921					
Jan.	1	To	Balance on hand		$6,840 30
			Boarding receipts		74,951 28
			Store receipts		8,695 75
			Dairy—Advanced registry		633 61
Dec.	31	By	Boarding	$64,132 00	
			Store	9,555 63	
			Dairy—Advanced registry	1,209 10	
			Balance on hand	16,224 21	
				$91,120 94	$91,120 94

Hatch Fund—Experiment Station.

1921					
Jan.	1	To	Balance on hand		$374 39
			United States check for quarter		3,750 00
April	1		United States check for quarter		3,750 00
July	1		United States check for quarter		3,750 00
Oct.	1		United States check for quarter		3,750 00
			Amount overdrawn		291 14
Dec.	31	By	Building and land	$191 49	
			Contingent expenses	90	
			Chemical supplies	59 08	
			Feeding stuffs	‘476 23	
			Fertilizers	1,445 66	
			Freight and express	213 25	
			Furniture	6 80	
			Heat, light, power and water	123 89	
			Labor	5,063 73	
			Library	110 90	
			Postage and stationery	223 92	
			Publications	1,195 10	
			Salaries	6,079 77	
			Seeds and plants	343 19	
			Tools and machinery	131 62	
				$15,665 53	$15,665 53

Postage and stationery	46 55	
Publications	56 00	
Salaries	1,473 72	
Scientific apparatus	19 35	
Seeds and plants	176 44	
Tools and machinery	778 89	
Traveling	329 85	
Balance on hand	185 25	
	$6,514 38	$6,514 38

SUMMARY, EXCLUSIVE OF EXPERIMENT STATION.

Total income, including balances:

United States—1890	$66,753 09	
United States—1862	2,500 00	
United States—1914	11,119 72	
		$80,372 81
State:		
Maintenance	$100,000 00	
Agricultural Building	53,104 24	
		$153,104 24
Institution:		
Current	$68,287 85	
Trust	91,120 94	
		$159,408 79
		$392,885 84

Total expenditures:

United States—1890	$41,712 36	
United States—1862	2,500 00	
United States—1914	11,505 19	
		$55,717 55
State:		
Maintenance	$100,000 00	
Agricultural Building	53,104 24	
		$153,104 24
Institution:		
Current	$68,236 42	
Trust	74,896 73	
	$143,133 15	
		$351,954 94
Balance on hand		$40,930 90

ADAMS FUND—EXPERIMENT STATION.

1921					
Jan.	1	To	Balance on hand		$398 29
			United States check for quarter		3,750 00
April	1		United States check for quarter		3,750 00
July	1		United States check for quarter		3,750 00
Oct.	1		United States check for quarter		3,750 00
			Amount overdrawn		697 99
Dec.	31	By	Building and land	$484 37	
			Chemical supplies	163 88	
			Feeding stuffs	938 09	
			Freight and express	18 17	
			Heat, light, power and water	560 68	
			Labor	3,576 89	
			Library	39 77	
			Live stock	126 00	
			Postage and stationery	9 12	
			Salaries	9,558 33	
			Scientific apparatus	328 00	
			Seeds and plants	218 43	
			Tools and machinery	74 55	
				$16,096 28	$16,096 28

MISCELLANEOUS FUND—EXPERIMENT STATION.

1921					
Jan.	1	To	Balance on hand		$574 62
			Department sales		5,655 04
			Department service		220 71
			Interest		64 01
Dec.	31	By	Building and land	$228 07	
			Chemical supplies	24 33	
			Contingent expenses	19 26	
			Feeding stuffs	300 45	
			Fertilizers	479 83	
			Freight and express	476 92	
			Heat, light, water and power	553 36	
			Labor	1,127 54	
			Library	238 57	

Balance held as follows:

Morrill Fund—1890	$25,040 73
Current Fund	51 43
Trust Fund	16,224 21
Smith-Lever deficit	385 47
	$40,930 90

I hereby certify that the above is correct and true, and truly represents the details of expenditures for the period and by the institution named.

R. S. BURLINGAME,
Treasurer.

This is to certify that we, the undersigned, auditing committee of the Board of Managers of Rhode Island State College, have examined the accounts of R. S. Burlingame, Treasurer of the said college, and find the same correct.

THOMAS G. MATHEWSON,
P. A. MONEY,
Auditors.

THIRTY-FOURTH ANNUAL REPORT OF THE DIRECTOR OF THE AGRICULTURAL EXPERIMENT STATION.*

PRESIDENT HOWARD EDWARDS,

Rhode Island State College.

DEAR SIR:—

I hereby submit brief statements of such experimental results obtained during 1921 as will serve to indicate the nature of most of the more important lines of work.

In such a report of progress it should be understood clearly that present ideas regarding the results are liable to modification in the future as the researches are continued. Nevertheless, it seems desirable to transmit annually in a paragraph the impressions which are derived from each project, even if some readers do attach too much importance to certain indications.

Publications.

The publications which have been issued in 1921 are as follows:

Six years' experience in improving a light, unproductive soil. *In* Jour. Am. Soc. Agron., 1921, 13, 37-41.

The need for lime as indicated by the relative toxicity of acid soil conditions to different crops. *In* Jour. Am. Soc. Agron., 1921, 13, 108-112.

Analyses of commercial feeds. Annual feed circular, April, 1921, 12 pp.

Thirty-third annual report of the station. *In* Bul. of Rhode Island State College, XVI, 4, 42-53.

Experiences with alfalfa. Bul. 184, March, 1921, 26 pp.

Fertilizer requirements of rotations including corn, potatoes, rye and hay. Bul. 185, April, 1921, 39 pp.

Liming with high-magnesium versus high-calcium limes. Bul. 186, May, 1921, 19 pp.

Inspection of commercial fertilizers. Annual fertilizer circular, October, 1921, 11 pp.

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*Contribution 287. In Bulletin of Rhode Island State College, Vol. XVII, February, 1922.

The relative growth response of crops to each fertilizer ingredient, and the use of this response in adapting a fertilizer analysis to a crop. *In* Jour. Am. Soc. Agron., 1921, 13, 353-359.

A study of the influence of physical soil factors and of various fertilizer chemicals on the growth of the carnation plant. Bul. 187, Dec., 1921, 94 pp.

Weather.

Detailed weather records may be found in the Climatological Data, New England Section, of the U. S. Department of Agriculture Weather Bureau. March, April and September were the warmest for these months in the 33 years' records at Kingston. May to July were about normal, August 2° below, and October 1.5° above normal in temperature. On Kingston Hill the temperature did not fall below freezing between April 12 and October 28, although there was killing frost in the lowlands on May 12 and 25, and October 14.

The rainfall in the spring was about normal. The October rainfall was the least since 1897 (1.07 in.); and the November rainfall the greatest since 1911 (7.98 in.).

Organic Matter for the Soil.

Of the four winter legumes which were sown between beans on August 14, 1920, red clover and vetch came through the winter undamaged; whereas sweet clover, and alfalfa to a less extent, had been heaved. They were all allowed to grow until May 2, when they were plowed under for green manure prior to planting Quincy Market sweet corn. With fertilizer containing only a little nitrogen, about a fourth more corn was produced on the red clover plat than on the three other plats, which yielded about alike. For a number of years the red clover plat has yielded as well as, or better than, any of the other plats.

Where corn is grown continually with complete fertilizer, 20 pounds of nitrogen per acre each year with a legume cover crop plowed in resulted in 84 bushels of corn; 60 pounds of nitrogen, with a rye cover crop plowed in, resulted in 70 bushels, and with no cover crop, 55 bushels.

In the market-garden rotations when supplied with plenty of fertilizer, early cabbages following late celery of the preceding year have given about the same yields, regardless of whether organic

matter has been supplied to the rotation in stable manure, peat, or green manures. The crops of early tomatoes and late celery, however, have not yielded as well with the peat and green manures as with stable manure. Early lettuce and late beets and spinach have never succeeded on the peat plat, even when accompanied with more lime and fertilizer than has been used with the stable manure. Green manures have not been used with these crops in the same connection.

Green manure crops planted broadcast after the middle of July, to find out which will subsequently produce, above ground, the largest amount of oven-dried material, have yielded the following as an average of three years:

	Dry Matter per Acre. Tons.		Dry Matter per Acre. Tons.
Japanese millet	2.44	Sudan grass	1.81
Pearl millet	2.39	Kale	1.65
Sunflower	1.94	Barley	1.57
Corn	1.89	Buckwheat	1.53
		Cowpea	1.26

Where only fertilizer chemicals are used in competition with 10 cords of manure per year for vegetable growing, about a tenth less Irish Cobbler potatoes were grown with the fertilizer. More green manure and nitrogen than formerly is being used on the fertilizer plat in an attempt to bring its production nearer to that of the manure plat than has been the case in recent years.

Oats were grown in pots and turned under at different stages of growth, to be followed by lettuce and carrots planted with and without lime at various times during the summer. The younger and also the partially rotted oats were the most valuable as green manure.

Efficiency of Fertilizers and Other Manures.

In case the water-insoluble nitrogen in the fertilizers sold in the state formed a considerable proportion of the guaranty, it was as usual specially tested for quality by both the Jones and Street methods in the laboratory and by crops growing in pots. There was still some nitrogenous material of poor quality which was not confined to an excess above the guaranty. Three brands received unfavorable

mention for this reason in the Annual Fertilizer Circular. Data are accumulating which will determine the relative merits of the laboratory methods, and the standards for discriminating between the poorer and better material.

Buckwheat was grown in cylinders with different carriers of nitrogen on acid soil and also on nearly neutral soil with and without a rye green-manure crop. In general the latter did not exert a marked effect.

For the fourth-year grass (about three tons) in which some clover persisted, 25 pounds of nitrogen seemed to be ample, so that practically the same yield of hay was obtained, whether the nitrogen was supplied in nitrate, sulfate, or cyanamid. Had there been a deficiency of nitrogen, that in the nitrate would probably have been superior as usual.

Marquis wheat which was sown early in April was chlorotic and abnormal on the limed plat receiving nitrate of soda, the soil of which at that time was neutral in reaction. The corresponding plat receiving sulfate of ammonia has never been quite neutralized, although it has in recent years been receiving additional lime; the wheat on this plat was of normal green color and appearance. The sulfate yielded 23.1 bushels and the nitrate only 11.3 bushels of wheat, thus demonstrating that slight acidity is desirable for wheat.

On an acid soil with a deficiency of only phosphorus, the yields of oat hay, with an equal amount of this element from different sources, decreased in the following order: Acid phosphate, Thomas slag, bone, double superphosphate, and floats or rock phosphate. Even where 2.25 times this amount of phosphorus (equal cost) had been used in the floats, the yield was materially less than with the acid phosphate.

After the early potatoes of 1920, a mixture of red, alsike and biennial sweet clover was sown in an experiment designed to show the effects of the different elements in the ordinary potash salts. In 1921, although the sweet clover had been heaved a great deal, it constituted most of the first crop, whereas the second crop was principally red clover. The potassium-magnesium sulfate continued to yield less than the other salts, or about one ton less than the 3.5 tons of sweet clover produced by the kainit and muriate.

Where early cabbages, tomatoes and lettuce have been grown in a rotation for six years, about a fifth increase of each crop has resulted by substituting the equivalent of three-fourths ton of a 4:10:2 fertilizer for half (16 tons) of the spring application of partially composted stable manure. Frequently greater increases were obtained by applying still more nitrogen and phosphorus for cabbages. More potassium has not been needed by any of these spring crops. For the second crops of this rotation, beets, spinach and celery, respectively, about the equivalent of a half ton of 4:7:6 fertilizer has been used to supplement the spring application applied with 16 tons of manure. As compared with the residues of the spring application of 32 tons of manure alone, this fertilizer increased the yield of beets about a fourth and spinach about an eighth. These crops further responded especially to more nitrogen, the beets also to more phosphorus and the spinach and celery to more potassium. With the extra amount of nitrogen, spinach and beets have been increased about a half and celery about a fifth as compared with the yields from the manure residues alone.

In a three-year rotation of (1) oat- and Canada-pea hay followed by rutabagas, (2) silage corn, and (3) mixed clover hay seeded in the corn, the oat- and pea-hay has yielded as an average of 1915, 1918 and 1921, 3.4 tons whether it received four cords of cow manure with planer-shavings bedding, or this manure supplemented with 175 pounds of acid phosphate. An equivalent amount of manure with straw bedding resulted in an average of 3.8 tons. During the same years the rutabagas as a second crop averaged 406 bushels with the "straw" manure, 370 bushels with the "planer-shavings" manure, 401 bushels where the latter was supplemented with 175 pounds of acid phosphate and 468 bushels where this amount was doubled. The rutabagas received no additional manure, but only the acid phosphate. They were especially responsive to this but have not yielded more when the manure was supplemented with muriate of potash.

Plant Differences and Needs.

Yellow-colored soybeans, sufficiently early to mature their seed, were again compared to determine their merits primarily for silage purposes. At the time of filling the silo, the undried plants, during the last four years, have averaged 9.8 tons for the Haberlandt variety

and 8.9 tons for the Austin variety. Other promising varieties which have been grown are Swan and Mongol. The Mongol matures earlier than the others. A sufficient proportion of soybean vines is not obtained when planted in the drill with silage corn. An equal area of the two silage crops planted separately, however, may be used in a mixed silage to materially reduce the purchase of protein concentrates.

Again, Leaming silage corn was not climbed well by New Era cowpea and velvet bean, and only a small proportion of the legumes was obtained. However, by planting one pole bean and one kernel of corn about every six inches in the drill, 20 tons of silage material was produced, over a fourth of which was composed of the beans. Horticultural, White Runner and Wild Goose pole beans were used. The Horticultural bean especially climbed the corn well and did not make a tangle which would interfere with the use of the corn harvester. Incidentally, it may produce shell beans for profitable marketing.

From 250 to 320 bushels of potatoes were produced with American Giant, Burbank, Kasoag Russet, Rural Russet, Green Mountain, Sir Walter Raleigh and Carman No. 3, and from 130 to 220 bushels by Netted Gem, Charles Downing, White Albino and Rural New Yorker.

Fourteen crosses of potatoes supplied by the U. S. Department of Agriculture yielded from 138 to 345 bushels in comparison with 315 bushels for Green Mountain.

In coöperation with the U. S. Department of Agriculture, Rhode Island white cap corn has been grown for the last three years in comparison with varieties submitted by the Department, and until this year the local corn has not been outyielded. In the exceptionally long season of 1921, however, the former advantages of early planting were not observed; and the slower-maturing varieties were favored as may be seen below:

	Bu. per acre.	
	Hard ears.	Soft ears.
R. I. white cap corn	74	5
No. 193, a yellow flint	80	7
Silver King, a white dent	88	8
No. 182, a white-dent silage corn	103	8

The Southport globe onions yielded about alike whether they were the red or yellow strain, although in the preceding year the red was more prolific.

The first year of mixed grasses, or principal clover year, in rotations without manure, was grown in 1921 on plats which have two amounts of each fertilizer element applied in order to determine the fertilizer needs of the crop. One plat, to which nitrogen has not been applied for at least a quarter of a century, has yielded an average of 4.3 tons in three rounds of the rotation; nevertheless, a half ton more was obtained by the use of a little nitrogen. Still more nitrogen made a further increase in the yield, but, as usual, seriously reduced the proportion of clover. Of the other fertilizer ingredients, the use of 50 as compared with 100 pounds per acre did not depress the yield in case of phosphoric oxid in acid phosphate, but did in the case of potassium oxid in muriate; this was true also of third-year hay. The topdressing for the first-year grass on the regular rotations is equivalent to 800 pounds of 3:8:7 fertilizer. In the same rotations, with a mixture equivalent to a 5:8:5 fertilizer, 1,000 pounds produced 2.9 tons of second-year hay, 1,200 pounds produced 79 bushels of corn, 1,600 pounds produced 294 bushels of potatoes and 600 pounds produced 25 bushels of rye. The fertilizer needs of these crops when grown in rotation are discussed in Bulletin 185 published during the year.

Named in the order of their lateness in maturing when all were planted on May 20, rye, wheat, barley, oats, buckwheat and millet were grown on a soil test. The deficiency of phosphorus was again the most pronounced, and the earlier the crop the more severe the deficiency. Only with rye and wheat was the potassium deficiency greater than that of nitrogen. Millet and oats secured their entire potassium needs from soil able to produce only about three-fourths of a maximum yield of the other crops. Regarding nitrogen fertilization, rye was least, and barley most responsive.

Rye, oats, buckwheat and millet are grown in a pot experiment to determine their relative response to fertilizer ingredients. This response generally differs with each crop and ingredient; for example, buckwheat appears to exhibit a high response to nitrogen, a low one to phosphorus and a medium one to potassium.

In solution culture, with given nutrients, oats and wheat produced

more grain than barley, and wheat a greater proportion than the other two of grain to the rest of the plant.

Discriminating fertilization cannot be practiced without a knowledge of the widely different response of crops to the fertilizer elements.

Asparagus yielded better with the chlorids than with the carbonates of potassium and sodium, where the soil reaction was favorable. Of course, the carbonates were effectual in reducing soil acidity. With insufficient amounts of potassium rather more benefit was derived from a supplement of chlorid than carbonate of sodium.

In the greenhouse, the best combination of sand, soil, peat, lime and fertilizer chemicals again produced only about half as valuable crops of lettuce, harvested in November, January and March, as were obtained with manure compost; and the comparison in case of the following crop of cucumbers was not very much more favorable. It is desired to find a non-manure medium in which normal growth results when and only if a complete fertilizer is added, in order that the nutrient requirements may be ascertained by the analysis of the crops receiving certain near-optimum applications.

Similar work in another room of the greenhouse includes two or three crops of radishes and spinach, in the fall and winter, followed by tomatoes. Radishes on only sand and fertilizer chemicals compared well with those in manure compost, but spinach, during the same season of the year, did not. With tomatoes transplanted in April there was evidence that sand and some combination of fertilizer chemicals may give normal growth.

The results of nine years' nutritional work with carnations are contained in the small edition of Bulletin 187. Some of the main points of interest are as follows: The same soil was supplemented with manure for five years with a reduction of only five per cent from the yields with new manure compost. Large applications of nitrogen reduced the percentage of split calyxes. In sand culture it made little difference whether nitrogen was added in calcium nitrate or ammonium sulfate; the usual acidifying properties of the latter, however, were demonstrated. As good results were obtained with sand and fertilizer chemicals as with manure compost. Sodium silicate had no effect on calyx splitting. A tendency to "yellows" was not overcome by iron sulfate.

Effect of Crops on Each Other.

The area used to determine the effect of two years' growth of sixteen different crops on a single crop grown subsequently was planted this year to the miscellaneous crops.

Late cabbages following four different first crops grown in the same season under like conditions have given the following yields as a four-year average:

	Late cabbage heads. Tons per acre.
Planted after spinach	10.13
Planted after beets	9.95
Planted after potatoes	9.62
Planted after peas	8.71

In the field in 1910, four times as large a yield of onions was obtained following grass sod as following buckwheat. This deleterious effect of buckwheat has been demonstrated repeatedly in pot culture. In one instance where onions absolutely failed to grow, about 300 parts of alumina per million of soil was soluble in a normal solution of ammonium chlorid, whereas, following grass, the onions made medium growth and the soil contained only half as much soluble alumina. This deleterious factor is very closely linked with the remarkably different responses of crops to lime, and to the very potent influence exerted by certain crops on others which are grown subsequently. The aluminum may be made inactive by excessive applications of only carriers of soluble phosphorus, also usually by lime in connection with ordinary phosphorus applications, or, most expeditiously, by combinations of lime and generous quantities of soluble phosphorus.

Rye, wheat, barley, oats, buckwheat and millet were grown in a soil test lengthwise the plats upon which they had been grown crosswise in the preceding year. Buckwheat was much the poorest after millet, and rye seemed to affect millet and barley unfavorably, although to a less extent.

Modification of Sour Soils.

Where the soil had been practically neutralized by the last application, in 1916, of high-magnesium limestone, high-calcium limestone,

or the burned and hydrated products produced from them, about 4.3 tons of second-year hay were produced regardless of the kind of lime. Without lime the yield was 3.2 tons. The results of this experiment are contained in Bulletin 186, the closing paragraph of which is as follows:

"Practically, like effects may be expected generally, regardless of which of the four limes is used, from an application having a given neutralizing equivalent; that is, based upon the per cent of magnesium oxid multiplied by 1.4, plus the per cent. of calcium oxid; *provided,* however, that the limestones are sufficiently fine to pass mainly through an 80-mesh sieve, and that the hydrates are used with the ordinary precautions."

In connection with numerous plats of different lawn grasses receiving various topdressings, mainly by the continued use of sulfate of ammonia, instead of nitrate of soda, soil acidity has been maintained to such an extent that weeds are entirely eliminated.

The neutralization by lime of all the acidity on half of the Phosphate Experiment reduced the oat hay to less than a half crop. The chlorosis which afflicted the oats has been noticed with other crops when the soil has been entirely neutralized, indicating that it may be undesirable to lime the soil so persistently that it will not impart a slightly pinkish color to blue litmus paper. A slight acidity seems to be favorable to the growth of plants, perhaps because it promotes adequate assimilation of iron.

Upon request of the market gardeners, a demonstration has been conducted for five years, of the efficiency of lime in preventing club root of late cabbage grown on the same land year after year. During that time 10,500 pounds of calcium oxid per acre, mostly in hydrate, have been used on one end of a plat in the spring and the soil rendered so distinctly alkaline that the growth of first crops, with even such high-lime needs as lettuce, onions and beets, was slightly depressed. Club root did not appear on the heavily limed part till the fourth year, and even then 8.1 tons of hard cabbage were produced there in comparison with none on the unlimed part which had become infested with club root, beginning with the second year. In 1921 the yield of cabbage heads was 4.9 tons of inferior size on the unlimed, and 19.2 tons on the limed part, the club-root infestation being much less on the limed area. In this demonstration no special precaution has been taken to prevent distribution of the club-root organism to the limed soil by the farm tools, etc. In 1921, somewhat scabby, untreated

early potatoes were planted prior to the cabbages, but there was very little scab in the harvested potatoes on either the limed or unlimed area.

Plant Propagation.

In the long season of 1921 there was very little difference in the maturity of corn, whether the planting was done on April 27 or a month later.

Again, Irish Cobbler potatoes from home-grown seed were inferior, as shown below. With the exception of the first-mentioned lot, it is obvious that the others had been grown one or more years in Rhode Island.

	Bu. per acre.
Seed grown in the north in 1920	175
Seed grown in the north in 1919	136
Seed grown in the north in 1917	87
Seed grown in the north in 1916	86

Prior to 1920 this early variety had not deteriorated for a number of years when grown in Rhode Island; but home-grown seed of the Green Mountain type has been almost invariably inferior compared with the northern product, in spite of various preventive attempts, such as early harvesting, late planting, mulching, coating with lime or gypsum, and hill selection. Much undue emphasis has been placed on the advantages of early maturity when in reality the superiority was due to the smaller-sized seed tubers and consequent greater number of eyes and stalks per ounce piece. This advantage may be shown with the smaller tubers from matured vines. It does not appear when the piece of seed tuber contains an equal number of eyes, and an equal stand of stalks is maintained.

Rhode Island white cap corn selected differently is being compared each year. Until last year the yields had been indicating that the seed ranked in the following decreasing order: (1) from areas where the backward tassels are removed; (2) from the progeny of ears shown by the ear-to-row method to be large producers, and (3) from corn grown in the usual way and selected only by its appearance in the bin. During the long season of 1921, the corn selected in the usual way was scarcely inferior to the others.

To avoid inaccuracies of weight due to the frequent depredations of field rodents when corn is dried in the shock, instead the portion of the stalk above the ears has been cut off, "topped", and the remainder left standing in the field to cure until husking time. In 1919, when the husking was done on November 25, the topped corn yielded a tenth more than the shocked corn, but in the long season of 1921 there was not much difference in yield when husked as early as the 10th of October, a very dry month.

Inheritance Studies with Poultry.

The lack of hatchability and vitality in the stock selected for heavy and light eggs has prevented rapid progress in that field. Indications are that further work will have to be confined to crosses between high- and low-weight strains. Crosses have been made between the selected strains and birds purchased in the market to see if the lack of vitality is heritable.

In the study of the inheritance of body weight the crossing of Hamburg and Cornish strains has been continued and considerable data are at hand. Stock has also been obtained to attack the problem by means of a cross between White Leghorns and Light Brahmas.

Studies in Diseases of Poultry.

Poults kept with hens and old turkeys died of blackhead when about two weeks old. Poults brooded artificially died of brooder troubles when they were from three weeks to six weeks old. Only a few developed blackhead, and that may be attributed to the fact that they got out once and joined the other poultry for a short time.

Since *Heterakis papillosa* has been found by Smith and Graybill to aid in producing the blackhead infection, the life history of this roundworm was studied and found to be direct with no passage through tissues after the larvae reach the intestine.

With chickens the study of bacteria of the paracolon type was continued.

Due to several outbreaks of bacillary white diarrhea in this state a study of this disease was undertaken. Eggs from hens not infected with *Bacterium pullorum* were found to produce chicks free from bacillary white diarrhea, even when subjected to abnormal tempera-

tures in incubation and brooding. Other work on the disease is being continued.

Due to several outbreaks in the state, of paralysis in old birds and of coccidiosis, a study of those diseases has been undertaken.

Respectfully submitted,

BURT L. HARTWELL,

Director.

Kingston, R. I.

REPORT OF THE EXTENSION SERVICE
R. I. STATE COLLEGE, 1921.

PRESIDENT HOWARD EDWARDS,

Rhode Island State College.

DEAR SIR:

I beg to submit herewith the annual report for the nineteenth year of the Rhode Island State College Extension Service.

Brief Summary and Recommendations.

Briefly this report records a few comments and outstanding facts which in spite of discouragements and obstacles not yet overcome denote definite progress. Some of the most disconcerting and difficult conditions which we encountered during the war were the frequent changing of personnel, the restive attitude of the workers and the lack of esprit de corps which we must acquire before we can make any progress in the systematic development of the work. We have had many changes during the year just past, but there is a much more serious attitude of the workers toward their tasks. Our efforts in the extension department are of necessity tied up in a very fundamental way with the farm bureaus, organizations over which we have no direct control or authority, and whose attitude, whether right or wrong, affects our efforts in a most vital manner, and whose cooperation we can get only as their officials are convinced of the real importance of the plans proposed. We feel that there has been a continued and wholesome development among the leaders in the farm bureaus during the past year toward a due appreciation of the importance of their work and the responsibilities which they carry, all to the very great present and prospective benefit of the work which we are carrying on in coöperation with them. There is also a definite awakening of community responsibility for work to be done in various sections of the state, a development which is absolutely necessary in order that the work may be carried into every community and to every farmer and farm home in the community.

The county extension agents are getting a better understanding of their work. Very much more definite plans have been prepared. More purposeful efforts are being made to carry the plans through to a successful conclusion. We have had some very excellent demonstrations during the past year. Much helpful organization work has been successfully finished, and the general outlook for more effective work another year is excellent.

In the belief that farmers and their families as well as other people of the state are entitled to an elementary organization for carrying to them the same kind of educational service from their state college and the United States Department of Agriculture enjoyed by other states, I respectfully renew my recommendation of previous years that the college join with the States Relations Service of the United States Department of Agriculture in assisting the farm bureaus to employ a full time worker in home economics in Providence County and county leaders in club work as rapidly as the farm bureaus obtain funds for this purpose, or if this is regarded as entailing too much expense for the near future, that an assistant club leader trained in home economics be jointly employed by the organizations mentioned.

In order also that we may be able to give to our farmers more satisfactory service in farm management, a line which is now recognized as not only fundamental to successful farming, but of which our farmers in common with those of other states stand in greatest need, I would earnestly recommend that sufficient funds be secured to meet the $1500 which the United States Department of Agriculture stands ready to contribute toward the establishment of extension work in farm management.

One of the great drawbacks in country life, especially for the younger people, and one which is undoubtedly a most potent cause for real discontent and the consequent flocking of farm boys and girls to the cities is the loneliness and lack of entertainment and educational opportunity in the country districts.

The "state-wide campus" is becoming more and more an important slogan among the state agricultural colleges and other state institutions. It would seem to me that the Rhode Island State College could well adopt this same slogan, since the institution has an unusual opportunity for service as well as an obligation toward the citizens of

the state—and especially to the farm population—to furnish inspiration, information and educational entertainment through its extension division to those who cannot come to the institution. Two important means for effective service not now used, or, if used, only in a very limited way, are the moving pictures and perhaps the radiophone.

Moving pictures provide a possible means of carrying to the country people wholesome entertainment, and they may also be made a most helpful and efficient means of imparting lessons in better agriculture, better home making and more successful self-help for rural communities. I hardly need emphasize in this connection the universal and emphatic conclusion among psychologists and educators that moving pictures constitute one of the greatest aids to teaching whether the object be mental or moral education, and that unless those who are interested in their right use take the opportunity to place the best films before the people, those who care nothing for the after effect and consider only the amount of money that they can get from their shows will usurp the function of entertaining the rural population.

The radiophone, while still new and undeveloped, also has in it excellent possibilities for meliorating the loneliness of the farm and farm families at a cost to the farm homes for receiving instruments of moderate range which will readily be within the reach of a very large majority of farmers.

It seems to me, therefore, wise for the institution to arrange if possible for an enlargement of plans and an increase in the equipment of the institution along these lines, now available in part at least to resident students, so that greater service may be rendered to those who cannot come to the college. The cost should not be very great, since probably the purpose may be accomplished through the establishment of a film library in the institution on the plans now being started by agricultural extension services in a great many agricultural colleges and the addition of radiophone sending apparatus to the present radio equipment.

Organization and Changes in Personnel.

There has been no vital change in the organization of extension work in Rhode Island during the past year. The service continues to function through its four main lines; namely, Administration,

County Agent work, Home Demonstration work and Club work. There has been no specialist work except that carried on for a few weeks last spring in farm management.

On January 17, Mr. Lorenzo F. Kinney, Jr., of Kingston, whose appointment was noted in my last report, began work as State Club Leader. Mrs. Harrington was asked on July 1 to take charge of the home economics work under the Smith-Hughes vocational project in the state, and since that time has devoted only one-fourth of her time to extension work. Miss E. Hope Browne, who had held the position of home demonstration agent for Southern Rhode Island and Providence County, resigned July 15 to attend summer courses at Cornell. When she returned she was appointed as assistant to Mrs. Harrington with the title District Home Demonstration Leader, with headquarters at the State College. She began her new work on September 1. Miss Anna L. Clark, a graduate of South Kingstown High School and Childs Business College, began work as stenographer in the extension office on January 7, taking the place of Miss Margaret Wilcox, whose resignation took effect in December. Miss Marion L. Barber, formerly a student at the Rhode Island State College and a graduate of the Katharine Gibbs School, Providence, R. I., was secured to take the place of Miss Ruth Gildea as stenographer in the Boys' and Girls' Club department. She began work on June 27. Mr. L. G. Dodge was employed from March 7 to June 30, as specialist in Farm Management. This work was made possible through the coöperation of the States Relations Service of the United States Department of Agriculture, which paid Mr. Dodge's salary, and the State Board of Agriculture, which shared in providing the necessary funds for traveling expenses.

On May 1 Mr. Francis S. Madison of East Greenwich was engaged as County Agent for Southern Rhode Island to take the position vacated by Mr. Comins September 30, 1920. Mr. Madison is a graduate of the Massachusetts Agricultural College in the class of 1912, and he has had considerable practical experience in farming both as farm manager and as operator of his own farm at East Greenwich. During the summer the Southern Rhode Island Farm Bureau went over its budget and plans for its work very carefully and finally determined that it would be possible to employ a home demonstration agent as well as a county agent. Miss Ruth G. Mur-

ray, who had formerly held the position of Home Demonstration Agent in Newport County, was appointed. She began work September 1.

Newport County was without a home demonstration agent from the time of Miss Murray's resignation, December 24, 1920, until February 7, when the place was filled by the appointment of Miss Daisy E. Harrison of Gondola Point, New Brunswick. Miss Harrison was a graduate of Macdonald College and had done graduate work at Columbia. She had had some practical experience in extension work also. In July, Miss Harrison was obliged to resign on account of the illness of her mother. The position was left vacant again for several months until November 22, when Miss Deborah P. Cummings of Centerville, Michigan, was appointed Home Demonstration Agent for Newport County. Miss Cummings received her training at the Michigan Agricultural College and at Cornell University, graduating from the latter institution with the degree of B. Sc.

New Equipment.

During the latter part of August the extension offices were moved from the old quarters in the north end of the first floor of Davis Hall to the second floor at the south end of the new Agricultural Building. The new quarters do not give a great deal more space, but as the Davis Hall rooms were always regarded as a temporary makeshift, we are finding the new arrangement with a definite division into offices much more conducive to satisfactory work. We now have separate offices for administration, club work, home economics, stenographers and for a library,—which may have to be used also as a general office if we have additions to the staff,—a mailing room and a home economics laboratory. A small storage room in the basement can be used as a temporary storeroom and for heavy material A larger room in the attic will provide space for permanent storage and for a work shop to be used in preparing and setting up exhibits. Very little equipment has been added with the exception of a kitchen cabinet, fireless cooker, oil stove and a few cooking utensils to be used in the home economics laboratory. Four sections for the transfer of letters and some shelving for the mailing room and library are the only other additions made this year. Our typewriters are in almost constant use, and one or possibly two of them should be renewed this

year. The mimeograph also is called upon for a great deal of service not only by this department, but also by other departments of the college, and repairs on it are becoming a constant source of expense from extension funds, so that it may be best to either send it back to the service station in Providence for a general overhauling or else secure a new machine.

Conferences.

The plan for weekly staff conferences to be held on every Monday morning at the college has been carried out more fully this year than during any previous year. Occasionally, however, important activities in the field call our workers out on Mondays, and under such circumstances the meetings here have to be cancelled. We find these conferences very helpful in promoting our work and keeping each worker acquainted with the work of the others. A full schedule of quarterly conferences have been held with the farm bureaus. At the March conference in Providence, club work as a part of the farm bureau program was discussed; at the June conference in Newport, the results of the farm management survey; in October at East Greenwich, the results of exhibits at the fairs and plans for the final conference at the college. The annual conference at the college was unavoidably broken up so that we took up part of the plans in December and part was left for a subsequent meeting in January. Beginning in August several conferences of county agents with the chairmen of committees at the college have been held with the purpose of developing a program for next season. A special conference was held in May, at which Mr. Brigham of the Editorial Division of the States Relations Service was present to give a talk on publicity and on the use of illustrative material in extension work. Mr. Brigham and Mr. Ackerman, a photographer, who accompanied him, made a trip to Newport for the purpose of making photographs illustrating home demonstration work in that district.

Campaigns.

The farm bureaus conducted membership campaigns during the winter and spring months to secure members on the new basis of $5.00 per family. A campaign manager assigned from the American Farm Bureau Federation helped in the work, and a total of family

five-dollar memberships practically equivalent to the number of single memberships at $1.00 of previous years was secured. The expense of the campaign, however, was so great that the funds available for the general work of the farm bureaus have not materially increased. It is hoped that if members renew for this year without the extra expense of a campaign the funds will be sufficiently large to help in maintaining the extension work of the farm bureaus.

Publications.

While the present plan of conducting the Farm Bureau News is not one that we wish to have continued, we have not yet been able to make any provisions through which the extension office can be relieved from the work of getting out this paper. The paper seems to have met with approval, and it is the general consensus of opinion among the farm bureau leaders as well as the county agents that it is helpful in carrying to the members the information that the farm bureaus have to distribute. It also keeps the farm bureau members acquainted with the work of the county extension agents, even though the reporting of the work has not yet reached a point where it is doing full justice to the agents and to the committees that are working with them. The time that those now connected with the paper can give to it is inadequate for the best results, and the paper will hardly reach its greatest efficiency until the income from it is sufficient to employ for a part time at least some one who is definitely charged with its management and who has had training in publicity methods. Beginning with the fourth volume, the first number of which was issued in December, the magazine form hitherto used was abandoned, and the paper will be put out without a cover and of a size approximately 8½ x 12, which size is used now by the majority of similar publications and which the printers tell us is the most economical for a small publication.

Three extension bulletins have been published; namely, First Principles in Clothing Club Work, 24 pages, by Mrs. Lillian L. Peppard, Professor of Domestic Art; First Principles in Food Club Work, 16 pages, by Elizabeth D. Bache, Professor of Home Economics; Thrift in Clothing, 16 pages, by Ida S. Harrington—a revision of Bulletin No. 5, New Series, by Esther P. Wold. During the past year and especially during the last four or five months there has been an un-

usual and, with the small editions of our publications, a somewhat disconcerting increase in the demands for our bulletins both within the State and without. We long ago abandoned the plan of maintaining a mailing list to which all bulletins were distributed because we could not afford, with the funds available, to print sufficiently large editions to meet the needs of such a plan. The letters that we are now getting with specific requests for certain bulletins indicate that the writers want the information and will probably make use of it. We cannot, of course, refuse to send the bulletins, as long as we have them, to people within the State since by doing so we would defeat the purpose for which they are printed, nor does it seem wise to refuse sending them out to people in other States for we need to give some little return for the large number of bulletins which we are getting both here and in the county agents offices and which contain information of great help to us. It raises, however, a very serious problem with us, for if it is necessary for us to reprint our present bulletins in order to meet the needs of our Rhode Island inquiries we cannot with our present funds hope to print new bulletins on other subjects as urgent needs will dictate.

Educational Exhibits.

Exhibits were made at the Washington County Fair, at the Newport County Fair, at the Providence County Fair at North Scituate, at the Pawtuxet Valley Fair at Fiskeville, and at the Ashaway Grange Fair. An exhibit was staged also at the Combined Show at the Armory in Providence in November. An attempt has been made to have this exhibit material in a more or less permanent form so that it may be used as a basis at least of exhibits for some time to come.

Finances of 1921-1922.

The following report is based on the report to the United States Department of Agriculture whose fiscal year ends June 30, 1921:

Regular funds of the college:

Federal Smith-Lever funds	$11,129 91
Supplementary Federal Smith-Lever funds	545 79
State Smith-Lever funds	1,673 70
Supplementary College funds	282 75

The following sums were allotted to Rhode Island from the regular appropriations of the United States Department of Agriculture and were paid out in salaries to co-operative employees:

For county agent work	$3,300 00
For home demonstration work	2,700 00
For club work	1,500 00

Owing to the relative increase in the rural populations of other States and the perhaps more apparent than real reduction of the rural population in Rhode Island, the funds from the Smith-Lever appropriations have been cut down approximately $344.68 from what they otherwise would have been this year.

Last year we stated that the U. S. Department of Agriculture would allot to Rhode Island $2,400 additional for home economics and club work, and $1,500 for farm management work provided sufficient additional funds be raised within the State with which to carry on this work. The home demonstration work has amply demonstrated its usefulness in the State when attached to and working in co-operation with the farm bureau organizations even though these organizations have not reached anywhere near their full efficiency. It has already been demonstrated by actual trial that it is not satisfactory to attempt to have a home demonstration agent cover two farm bureau districts. The demand for the work is only beginning to develop and yet a single worker in two districts has been completely swamped by the requests for help that come in. We believe that the time will come in a not very distant future when a single home demonstration agent for a farm bureau district will not be considered sufficient. This prediction is based on a simple realization of what a large number of people there are who need the home demonstration agent's assistance and who are above the school age or so situated that they cannot attend regular class work and yet who are not so old that they have lost interest in better methods of conducting the work of the home. It would seem, therefore, that we are only meeting a most elementary need in helping each farm bureau to employ one worker in this line. Club work likewise needs no argument to maintain its importance as a supplement to the class room work of the established schools, not primarily as vocational training, but as a cultural training toward a full and sincere realization of the essential importance and worthwhileness of agriculture

and home economics. It should be evident to anyone who considers the number of young people in our rural districts alone,—and they are by no means all that can be greatly benefited and who should have the work,—that the organization with one agent in each farm bureau district and a State leader, or a State leader with an assistant trained in home economics, will be only a fair provision for carrying on the work of helping to teach the men and women citizens of tomorrow the importance, dignity and intrinsic value of agriculture and home making in the life of the State and Nation.

Farm management also needs no special plea to establish its importance. Those who have given recent developments in agriculture any thought are aware of the tremendous importance now being attached to the idea that the farmer is a business man in the best sense of the term, and that his success or failure depends upon the business like management of his farming enterprises. The few weeks that we had this work conducted last spring by Mr. Dodge amply demonstrate in a practical way its value in giving the county agents and the farmers with whom they worked a new grasp of the importance of this line and the help that it will give in making our extension work more efficient. The Department of Agriculture in pursuance of the provisions of congresional acts making appropriations for its extension work is offering to contribute $1,500 to help this State in establishing permanent extension work in farm management and to make up in part for the discrimination under which Rhode Island suffers through the inequitable distribution of Smith-Lever funds, but it bases such help on the condition that the State should meet the Department at least half way in maintaining the work.

Work with Projects.

Project I. *Administration.* Under this project are included the various activities connected with the administration of the different funds devoted to extension work, the co-ordination of the various lines within the extension division and to some extent their contact with other activities within the State. Work along this line is perhaps sufficiently indicated by what has already been presented in this report. A good deal of miscellaneous work which would naturally be referred to specialists if we had them also falls under this project including the answering of a large number of inquiries

which come into the department from people seeking information on a great variety of subjects. Space will not permit the discussion of these activities except to say that the handling of the questions requires the dictation of a great many hundreds of letters each year and quite a good deal of time must be given to this line of work.

Project II. *County Agent Work.* The tendency toward rapid changes in county agent positions seems to be on the wane, and we are looking forward to more permanent employment and therefore more careful plans in which college and farm bureau employees will work together and carry on a more systematic attack on the problems of Rhode Island agriculture. The organization of county agent and farm bureau work in the State has not been vitally changed. Two of our farm bureaus, Newport County and Southern Rhode Island, are apparently in an excellent condition. Both of them are employing a county agent and a home demonstration agent. The two lines of work are both apparently meeting with enthusiastic support from the farm bureau members and from the people generally. Newport County has received considerable help from sources other than public funds, and Southern Rhode Island is getting a fair amount of support from the majority of the towns. Southern Rhode Island is also working out with apparently good results a program of organization-from-the-communities-up by requiring that a community can have representation in the farm bureau only by electing a representative to the farm bureau. There is a continued growth of better understanding among the farm bureau members over the entire State with regard to the proper development of farm bureau work and the relation of the bureaus and the college to the work. All three bureaus have executive committees who not only desire to have their respective farm bureaus develop, but who also are anxious to learn the best methods of developing their responsibilities. Although there are some financial difficulties in one bureau it can now be stated that all three bureaus are on a business like basis and have officials who are not only willing to serve as financial officers but who have the requisite time to give to it. To emphasize the proper relationship between the farm bureaus and county extension work, considerable publicity has been given to the Memorandum of Understanding between the Executive Committee of the American Farm Bureau Federation and the States Relations Service, United States Department

of Agriculture. This memorandum has been formally adopted by the Newport County Farm Bureau and the Southern Rhode Island Farm Bureau.

The county agent leader prepared at the beginning of the year a program of work which he has attempted to carry out during the year so far as his time permitted. This program stressed better and more business like methods in the farm bureaus, and through the co-operation of the home demonstration leader and agents and the women members of the bureau which needed the work most and who have staunchly supported it, the progress in this line has been far greater than could have been anticipated at the beginning of the year. Another feature of the leader's program has been to secure a more definite development of plans for work by the county agents, and this has also, through the help of Mr. Dodge, the farm management demonstrator employed last spring, and County Agents Knott and Madison, as well as workers here at the college, become possible to a degree which was hardly expected when the program was formulated. Some advance has been made in co-ordinating club work at the college with the other activities of the farm bureaus, and while a more rapid development along this line awaits the time when there shall be local paid club leaders in each farm bureau, or at least some other help to the State leader, some progress has been made. The Southern Rhode Island Farm Bureau, as a result partly of the organization-from-the-community-up plan and partly of the hearty acceptance of the community organization method by both the farm bureau officials and the agents, has made rapid progress. More or less active community committees are at work in nearly one half the towns in the two counties. One of these communities which began work three years ago and which has had up to last spring scarcely any assistance from the county agent, put on an excellent local demonstration of definite value to the community during the past season.

Some of the outstanding facts concerning the county agent work for the past year taken from the statistical report of the leader are as follows:

FARM BUREAU ORGANIZATION.

Executive Committee meetings held	30
Total attendance	253
Community meetings held	15
Total attendance	225

SOIL IMPROVEMENTS PROJECTS.

Farms on which lime or limestone was used	199
Tons of lime or limestone	580

CROP PROJECTS—POTATOES.

Farmers spraying potatoes for disease	34
Acres of potatoes sprayed for disease	101

LIVE-STOCK PROJECTS.

Cow testing associations in state	4
Number of members	68
Cows tested in 1921	1,253

FARM ECONOMICS PROJECTS.

Farm account books distributed	60
Farmers assisted in summarizing and interpreting their accounts	95
Farmers making changes in their business as result of keeping accounts	48
Other farmers adopting cropping, live-stock, or complete farming systems according to recommendations	30

OFFICE AND FIELD SERVICE.

Different farmers visited on their farms	956
Total farm visits made	1,934
Office consultations relating to farm bureau work	2,026
Agricultural meetings attended by agents	109
Total attendance	4,322
Agricultural articles written by agents and published in local papers	168
Agricultural articles written by agents and published in Farm Bureau News or similar publication	195
Personal letters written and mailed	2,036
Total number copies of circular letters mailed	10,078

Project III. *Home Demonstration Work.* Home demonstration work in the past year has suffered perhaps more than at any time in the past under the same sort of difficulty that has beset the county agent work in the matter of securing adequately trained agents and of organizing their work. None of the districts have had continuous work throughout the year. A home demonstration agent was appointed for Newport in February, but she was compelled to leave after a few weeks on account of illness in her family. She returned in May, but was compelled to leave permanently in July. It was impossible to secure another worker until November. The joint

employment of a home demonstration agent by the Providence County and Southern Rhode Island Farm Bureaus was discontinued July 1, and Southern Rhode Island arranged to engage an agent to give her whole time to this district beginning September 1.

Community committees were formed in seven towns of Newport County, but they had not made much progress when the home demonstration agent left. The value of local leadership is shown by the fact that a group of local women took full charge of the home economics exhibit at the county fair. The plan of collaborating with the Charity Organization Society in its budget and nutrition work has been successful. Although health work has been developed through the dress form project, the most systematic work has been done in connection with the Charity Organization. The cleaning of homes and back yards, the sanitary care of food and personal health habits have been stressed. In nutrition, lessons in food selection and preparation were given as part of the budget program. The use of skim milk as a means of stretching the food allowance was taught. Training classes for local leaders in millinery have been held and a number of lecture demonstrations given. Five groups were organized for clothing work, first making dress forms and then being taught how to use them efficiently. Two three-day extension schools, taking up the dress form, use of commercial patterns and millinery were held on Block Island. Work in household management for which Miss Harrison had enlisted the aid of a number of shops in Newport was necessarily interrupted when she left.

Providence County has found itself unable to continue to support even a part time home demonstration agent since the employment of an agent in co-operation with Southern Rhode Island was discontinued in July. Canning reports from this county have been planned to include information as to whether products were home grown or purchased. This information should be valuable in indicating the relative amount of home grown goods used. The Co-operative Nutrition Bureau, of which the State leader is an ex-officio member, now employs three full time workers in the city of Providence. They are carrying on nutrition classes in the schools and doing follow-up work in the homes. One of them directs the school lunch at a high school to demonstrate the value of wholesome and suitable meals. The dress form project in this county is leading to group and com-

munity work, and it has been made the occasion of "community parties." Millinery work has also been popular. Following a suggestion of the State leader, three women's organizations in Providence are establishing a Salvage Shop. The profits will be used for extending nutrition work. The New England Home Economics Association was entertained in Providence by a number of organizations. The afternoon session was a get-together meeting and at this meeting some astonishing discoveries were made as to the number of welfare and educational agencies now duplicating each other's efforts in Providence.

The Southern Rhode Island Farm Bureau is the best organized in the State, and community committees and project leaders are being made a practical reality. One community has carried on a health project, organized by the State leader and the local committee. The work has been carried out by the home demonstration agent along the lines advised by the State College physician and the district nurse. It has included corrective diets, methods of rest and recreation, personal hygiene, sanitation and first aid. Posters have been used and discussed at the meetings. Monthly reports are sent to the home demonstration agent who plans a series of follow-up visits. The home demonstration agent is trying to co-ordinate the work of a Red Cross Chapter, Nursing Association, Parent-teacher Association and school physician in order to establish health clinics and start nutrition work on a more extensive scale. A milk bar was held at the fair at Kingston, and the success of the venture even under unfavorable conditions led to its continuance by Southern Rhode Island and Providence County acting jointly at the Pawtuxet Valley Fair. In one community health and nutrition meetings for mothers and children have been held at the child welfare rooms. The aim is to establish the hot school lunch and to increase the use of milk in the schools of the community. The dress form project has been adopted by four communities, and one has reached the point of carrying it on under local leadership. This group will shortly carry the project to a neighboring community. Millinery work is being done in two communities. Two demonstrations in dyeing were given at the State College by a representative of the American Dye Corporation.

A brief catalog of some of the work which can be reported in

numerical form follows: In Newport County 8 training classes for local leaders in millinery, and 36 lecture demonstrations were held. One hundred women were organized in groups of 20 for clothing courses, making dress forms first and then being taught to use them efficiently. Two three-day extension schools were held on Block Island, teaching dress forms, use of commercial pattern, millinery, etc. In Providence County, 735 dress forms have been made. In Southern Rhode Island 4 communities have adopted the dress form project and 2 the millinery project in addition to the nutrition and community health work already mentioned.

Project IV. *Club Work.* The item of chief importance in the work under this head this year is the effort to tie up club work with other extension activities by projecting it into the communities through the farm bureaus. This is in no sense a breaking away from the policy of co-operating with the school teachers and superintendents, but simply an effort to unify the work in the communities by carrying it to the communities through farm bureau channels the same as other extension work. We continue to recognize the close sympathy which should exist between the common schools and club work. Ideally the schools of a community should be deeply interested not merely in the teaching of children in the class room but also—and this is the field of club work—in surrounding the children in the home with helpful educational influences. It is also of course patent that the teachers are in many respects highly qualified for local leaders and whenever a teacher is found who is willing to give of her time to club leadership for the good that it will do in the homes and the community and for the helpful reaction which it must eventually have on the school work itself, we are glad to welcome her assistance as heretofore. Superintendents are not only encouraging their teachers, but are themselves helping in the various club activities. In localities where teachers are not available for local leadership and where there are public spirited adult men or women who will take leaders' responsibilities, arrangements along this line have proven very satisfactory. Quite frequently former teachers take up this work and are, of course, well qualified to do it successfully.

Another feature which has received especial attention this year has for its purpose to make the work more effective. The mere

data were compiled which give some very definite suggestions for future work by the county agents. Among other results the tabulation indicated with the utmost clearness that the arguments used by all our workers in favor of better cows were fundamentally sound. The dairyman with a good herd of cows is making a little money over and above his regular fixed charges and is getting some returns for his labor. On the other hand the dairyman with cows producing less than 5,000 to 6,000 pounds finds himself conducting a losing business. It is also found that dairymen, who peddle their own milk, are getting relatively more for their labor in peddling than from production, and a few of those having poor cows retrieve their losses in production by making some money on the peddling. A third conclusion is that in a general way the diversified farm is more likely to give the average farmer some profit than the specialized farm.

In conclusion the writer wishes to acknowledge the continued interest in the extension service on the part of the college authorities and the co-operation of various workers in the teaching departments and the experiment station. also the help which we have received from time to time from the extension staff, States Relations Service, United States Department of Agriculture. A spirit of team work and loyalty to the work and to the college among the workers in the extension office and in the farm bureaus has been most gratifying, and the co-operation of the farm bureau committees and members has done much to further the work this year.

Extension work is yet new and its possibilities for service to the people of the State are somewhat difficult to determine. Observations made in various institutions throughout the country which have extension divisions would seem to indicate that the work from these divisions has been very helpful not only in serving a larger proportion of the constituency of these institutions, but also in creating a greater interest among the people of their respective states in the institutions. It should be reasonably safe to predict that as extension work becomes more fully developed as a result of more careful study and continued experience, will be able to render still greater service to the people who cannot come to the institutions themselves.

Respectfully submitted,

A. E. STENE,
Director.

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A. E. STENE,
Director.

APPENDIX A.

Summaries Dealing with Certain Phases of Receipts and Expenditures for the Year Ending June 30, 1921.

Summary for Year.

Balance on hand July 1, 1920	$150,607 62
Total income during year	380,496 77
Total	$531,104 39
Total expenditures during year	468,981 30
Balance on hand July 1, 1921	$62,123 09

Income.

Income from students:

Tuition fees	$2,517 50	
Matriculation and incidental fees	3,832 41	
Chemicals and laboratory supplies	3,670 78	
Dormitory fees	7,398 74	
Dining halls	78,004 18	
Store sales	9,753 95	
		$105,177 56

Income from State and Nation:

State—Maintenance appropriation	$100,000 00	
Agricultural Building	25,000 00	
Maintenance deficiency appropriation	15,294 06	
Greenhouse appropriation	7,024 00	
		$147,318 06
Federal—Morrill Act of 1890 and Nelson Act of 1907	$50,000 00	
Morrill Act of 1862	2,500 00	
Hatch Act of 1887—Experiment Station.	15,000 00	
Adams Act of 1906—Experiment Station	15,000 00	
Smith-Lever Act of 1914—Extension	11,673 70	
		$94,173 70

Income from other sources:		
Department sales and service		$25,534 19
Interest		430 21
Experiment Station:		
Department sales and service	$7,780 91	
Interest	82 14	
	$7,863 05	
		$33,827 45
Total income		$380,496 77
Receipts from tuition		$2,517 50
Students taking course of one year or more	356	
Students paying tuition (non-resident in Rhode Island) at rate of $50 per year	54	

EXPENDITURES..

Expenditures, exclusive of Experiment Station and Extension Service:		
Advertising in publications	$181 45	
Apparatus	4,721 83	
Auto and stable supplies	1,805 10	
Boarding	65,597 27	
Books and periodicals	944 10	
Commencement	1,303 23	
Construction and repairs	16,301 13	
Construction and repairs, special	122,351 35	
Dormitory and land rental	3,608 16	
Electric current furnished from outside college	1,004 95	
Entertainment	463 45	
Feed	6,808 34	
Fertilizer	722 16	
Freight and express	744 10	
Fuel	38,666 48	
Furniture	1,603 43	
Gasoline and oil	2,337 80	
Janitor supplies	529 21	
Labor (engineers, poultrymen, farm, etc.)	23,328 83	
Labor (undergraduate, exclusive of boarding department)	5,328 86	
Laboratory supplies	2,612 87	
Live stock	65 00	
Postage, stationery and printing	4,663 38	
Refund	1,002 31	
Salaries	94,294 94	
Seeds	370 48	

Store	9,696 28	
Telephone and telegraph	841 57	
Tools and machinery	421 11	
Traveling	2,121 08	
Miscellaneous	2,810 79	
		$417,251 04
Expenditures, Experiment Station		38,100 11
Expenditures, Extension Service		13,630 15
Total expenditures		$468,981 30

SUMMARY OF BALANCES, JULY 1.

	1920	1921
Morrill Fund of 1862	.....	.....
Morrill Fund of 1890	.....	.....
Smith-Lever Fund Extension Service	.....	.....
Hatch Fund, Experiment Station	.....	.....
Adams Fund, Experiment Station	.....	.....
State—Maintenance	$34,775 77	$31,607 68
State—Agricultural Building	111,664 57	14,313 22
Current Fund	4,871 49	4,678 88
Trust Fund	3,388 58 Dr.	9,076 00
Miscellaneous, Experiment Station	684 37	447 31
Reserve Fund	2,000 00	2,000 00
	$150,607 62	$62,123 09